Formulation of a Margarine Recipe

Aim of the work

- To understand the basic components of margarine.
- To learn how to formulate margarine recipes according to fat, water, and emulsifier content.
- To calculate ingredient quantities for a desired batch size.

Theoretical background (brief)

Margarine is a water-in-fat emulsion made from vegetable oils and/or animal fats. The main components are:

- **Fat phase**: vegetable oils, butterfat, or hydrogenated fats (80-85 %)
- **Water phase**: water, milk, or whey (15-20 %)
- **Emulsifiers**: lecithin, mono- and diglycerides (0.5-2 %)
- **Salt and additives**: flavorings, vitamins, colorants, preservatives (0.1-1 %)

The formulation of margarine depends on the desired properties such as spreadability, melting point, and taste.

General formulation example (1000 g batch)

Component	Percentage	Mass (g)
Fat (vegetable oil + butterfat)	82 %	820
Water / milk	16 %	160
Emulsifier (lecithin)	1 %	10
Salt and additives	1 %	10

Practical calculation

Step 1: Determine fat content

$$M_{fat} = 1000 \times \frac{82}{100} = 820\ kg$$

Step 2: Determine water content

$$M_{water} = 1000 \times \frac{16}{100} = 160\ kg$$

Step 3: Emulsifier and additives

$$M_{emulsifier} = 1000 \times \frac{1}{100} = 10\ g \quad M_{additives} = 1000 \times \frac{1}{100} = 10\ g$$

Step 4: Prepare the margarine

1. Melt the fat phase at 40-45 °C.
2. Dissolve emulsifier in a small amount of water.
3. Slowly add the water phase to the melted fat while mixing continuously.
4. Cool the emulsion with constant stirring to obtain a stable margarine.

Result

A 1000 g batch of margarine consists of 820 g fat, 160 g water, 10 g emulsifier, and 10 g salt/additives.

Independent practical tasks

1. **Formulate a 500 g batch of margarine** with 80 % fat, 18 % water, 1 % emulsifier, 1 % salt/additives.
2. **Formulate a 2000 g batch of low-fat margarine** with 60 % fat, 38 % water, 1 % emulsifier, 1 % additives.
3. Adjust the recipe for **flavored margarine** by adding 2 % flavoring oil in a 1000 g batch while keeping the fat content constant.

Conclusion

Proper formulation and calculation of ingredients ensure desired consistency, taste, and stability of margarine.